



SALVAGE PLAN



SLBB ROCK BARGE WRECK REMOVAL

Draft Revision

Location: Hylebos Waterway, Tacoma, Washington

November 7, 2015

Confidentiality Statement

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Contents

1	Casualty Description and Current Condition	3
1.1	Incident & Initial Actions	3
1.2	Vessel Specifications	3
1.3	Hydrostatics and Barge Weight.....	3
1.4	Current Condition.....	5
1.5	Casualty Location Contamination	7
2	Salvage Methodology and Operations.....	8
2.1	Rigging for Lifting	8
2.2	Lifting and Refloating	9
2.2.1	Lift Connections	9
2.2.2	Lifting Operations	10
2.2.3	Dewatering	10
2.3	Towing.....	11
3	Salvage Operations Schedule.....	11
4	Weather Criteria	11
5	Safety.....	12
5.1	Regulatory Compliance	12

Attachment A: DSV PRUDHOE BAY Specifications

Attachment B: Derrick Barge LOS ANGELES Specifications

Attachment C: Derrick Barge 24 Specifications



1 Casualty Description and Current Condition

1.1 Incident & Initial Actions

While tied alongside the transition span at Walrath along the Hylebos Waterway, the SLBB Rock Barge sank and heeled to port in the early morning hours of November 6, 2015. Global Diving contained light sheen from the barge with contractor containment boom. A dive survey was conducted by Global and the barge's 235 Excavator and 40-gallon spud winch fuel tank were recovered to the surface to remove pollution potential.

1.2 Vessel Specifications

SLBB Rock Barge is a 145 feet long by 45 feet wide by 11 feet deep steel deck barge with bow and stern rakes. The barge was loaded to a draft of 3.5 feet with 350 short tons of 6-man granite rock (6-man rock is between 6,000-8,000 pounds per rock with rough outer dimensions of 54 inches to 60 inches). The barge has two round spuds on the port side, near the rake bulkheads (approximately 20 feet inboard of each end). Although the barge is subdivided into 5 internal compartments, these compartments reportedly lack watertight integrity allowing free communication of internal water throughout the barge.

1.3 Hydrostatics and Barge Weight

Global created a digital hydrostatic model of the barge and generated the following table of hydrostatic properties. From this hydrostatics data, the empty weight of the barge is estimated at 235 short tons. However, this weight is only estimated from the amount of cargo reported and the reported loaded draft.



LCF Draft (ft)	Displacement Weight (ST)	Center of Buoyancy (ft) LCG	VCG	Weight (ST) per Inch	LCF (ft aft)
1	154.75	72.50a	0.5	13.19	72.50a
1.25	194.56	72.50a	0.63	13.34	72.50a
1.5	234.82	72.50a	0.75	13.49	72.50a
1.75	275.52	72.50a	0.88	13.64	72.50a
2	316.67	72.50a	1.01	13.79	72.50a
2.25	358.27	72.50a	1.13	13.94	72.50a
2.5	400.32	72.50a	1.26	14.09	72.50a
2.75	442.81	72.50a	1.39	14.23	72.50a
3	485.71	72.50a	1.52	14.37	72.50a
3.25	529.02	72.50a	1.66	14.5	72.50a
3.5	572.72	72.50a	1.79	14.63	72.50a
3.75	616.83	72.50a	1.92	14.77	72.50a
4	661.33	72.50a	2.05	14.9	72.50a
4.25	706.23	72.50a	2.18	15.03	72.50a
4.5	751.54	72.50a	2.32	15.17	72.50a
4.75	797.24	72.50a	2.45	15.3	72.50a
5	843.35	72.50a	2.58	15.43	72.50a
5.25	889.85	72.50a	2.71	15.57	72.50a
5.5	936.75	72.50a	2.84	15.7	72.50a
5.75	984.06	72.50a	2.97	15.83	72.50a
6	1,031.73	72.50a	3.11	15.95	72.50a
6.25	1,079.76	72.50a	3.25	16.07	72.50a
6.5	1,128.16	72.50a	3.38	16.19	72.50a
6.75	1,176.92	72.50a	3.52	16.31	72.50a
7	1,226.04	72.50a	3.65	16.43	72.50a
7.25	1,275.52	72.50a	3.79	16.55	72.50a
7.5	1,325.36	72.50a	3.92	16.67	72.50a
7.75	1,375.56	72.50a	4.06	16.79	72.50a
8	1,426.13	72.50a	4.19	16.92	72.50a
8.25	1,477.05	72.50a	4.33	17.04	72.50a
8.5	1,528.34	72.50a	4.46	17.16	72.50a
8.75	1,579.99	72.50a	4.6	17.28	72.50a
9	1,632.00	72.50a	4.73	17.4	72.50a

Table 1: Hydrostatics Properties with No Trim and No Heel



1.4 Current Condition

The barge remains sunk in position 47° 16.477'N, 122° 22.911'W. Global conducted a dive and site survey on November 6. At the time of survey, a 100 ft by 45 foot deck barge was spudded over the starboard bow of the casualty barge. Diver measurement indicates that this spud barge may contact the casualty barge at a +0.5 feet above MLLW tide. Personnel at Walrath are making plans to move the barge prior to the Tuesday's low tides. The transition span (bridge) at Walrath is supported by a 40 foot by 25 foot float offshore. Diver measurement indicated that this float would contact the casualty barge at a +2 feet above MLLW tide. The float is also at an 18 degree heel angle and the side of the float will make contact against the side of the casualty barge.



Figure 1: Site Layout: SLBB Barge (Grey), Walrath Barge (Red), Walrath Transition Span Float (Purple)

The barge is on bottom with the offshore (port) side embedded 9 feet into the mud bottom. The barge has 18 degrees of port heel with the starboard side deck approximately at the MLLW line and the port side deck at 14 feet below MLLW. The spuds on the port side extend 9.5 feet above the MLLW line. The starboard bottom of the barge is 6 feet above the mud line.



The 6-man rock cargo from the submerged barge was located offshore and embedded into the mud with less than 3 feet extending above the mud (25 feet below MLLW). In most cases, the rock extends only 1 foot above the mudline.

Deck and upper side shell damage to the submerged barge is extensive and typical of many rock barges. Split plate seams at the deck edge and holes throughout the deck were observed by the diver. The starboard side shell appears intact from 2 feet below the deck to the bottom of the barge (the port side shell was obstructed by embedment into the mud).

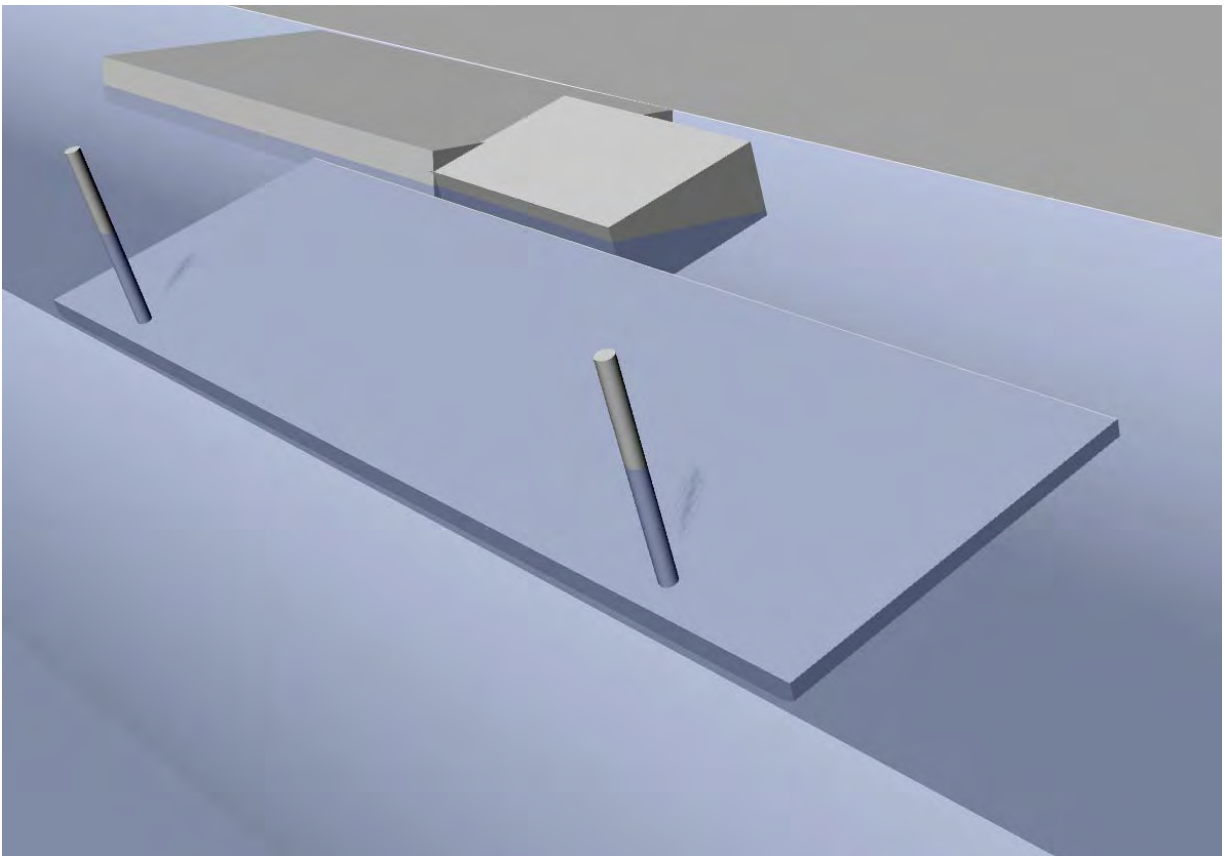


Figure 2: Rendering Sketch of Barge Orientation with Transparent Waterline at MLLW



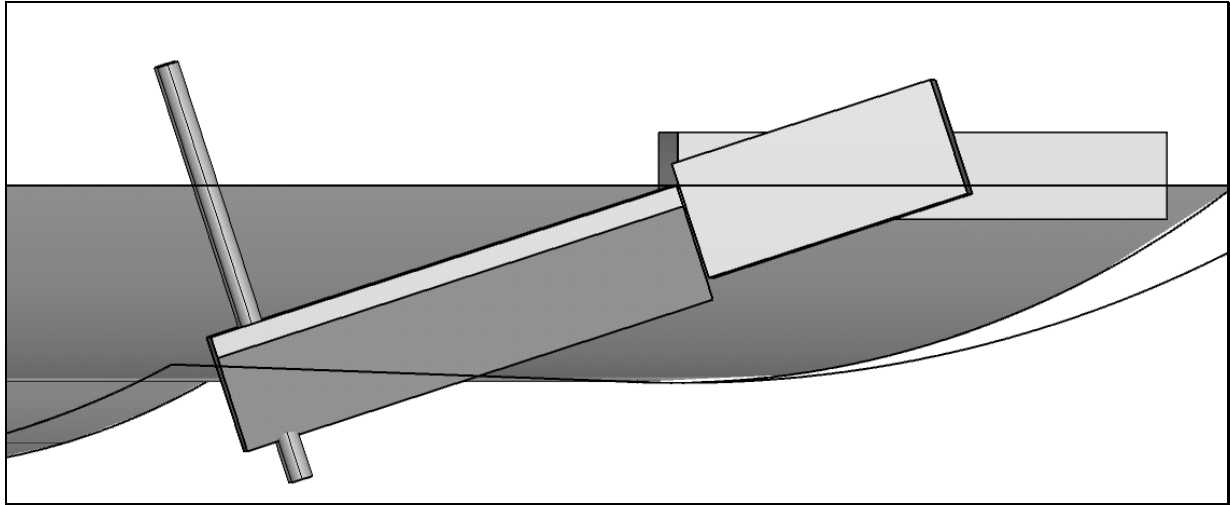
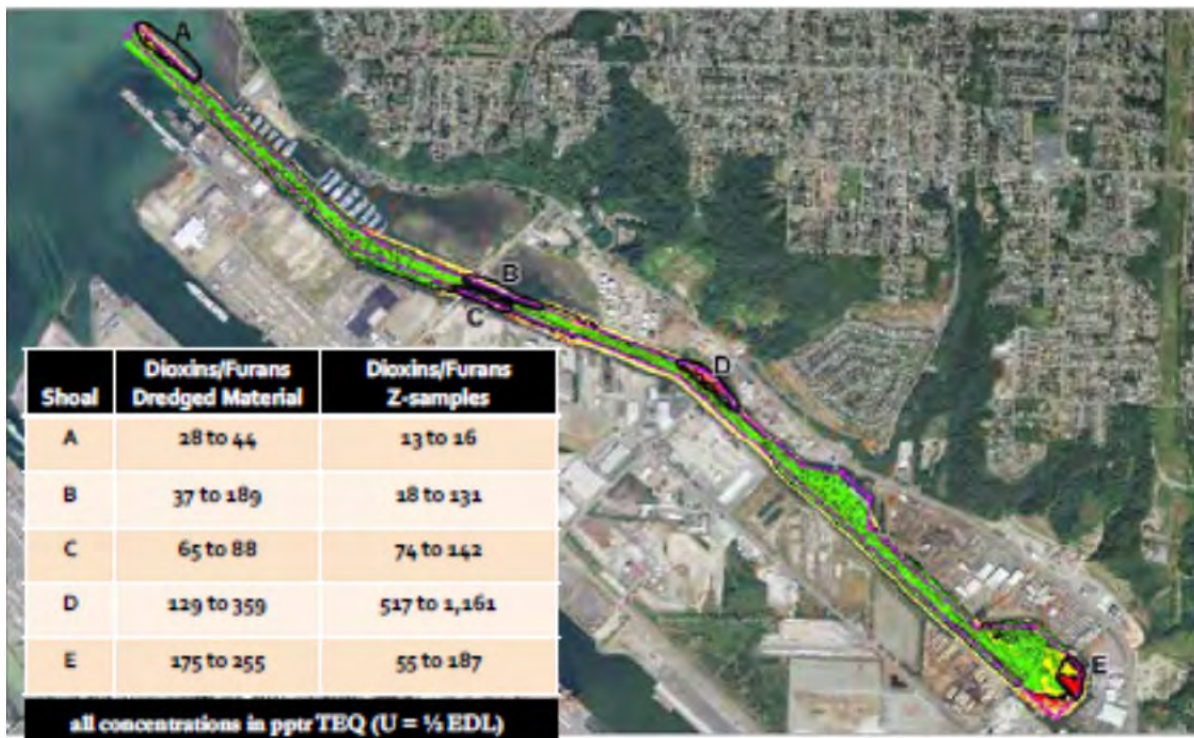


Figure 3: Sketch of Barge Orientation with Bottom and Surrounding Barge and Float at MLLW

1.5 Casualty Location Contamination

The casualty location is within the Hylebos Waterway which has areas of significant soil contamination. In the June 2014 Sediment Management Annual Review Meeting, the US Army Corps of Engineers presented data that the casualty site contains Dioxins/Furans with concentrations of 517-1,161 parts per trillion as shown in the following diagram (the casualty location is at “Shoal D”).



2 Salvage Methodology and Operations

The objective of the Salvage Plan is to raise and refloat the sunken barge causing minimum environmental impact. Raising of the barge will be accomplished using two floating cranes to bring the deck of the barge to the surface where the vessel will be patched if necessary and dewatered to refloat. The salvage operation will be carried out in the following major phases: 1) rigging for lifting, 2) lifting and dewatering, and 3) towing.

2.1 Rigging for Lifting

Global will mobilize our 65' Dive Support Vessel PRUDHOE BAY and a work skiff to the sinking site. PRUDHOE BAY will serve as dive platform and perform light crane service (specifications included as Attachment A). The work skiff will provide crew and material transport and assistance with straps. PRUDHOE BAY will moor to barges on site or use anchors as necessary (DSV PRUDHOE BAY drafts 3.5 feet of water).¹

Divers aboard PRUDHOE BAY will route small diameter (1/2" or less) steel wire messenger line below the rakes of the sunken barge. The steel wire will be basketed below the barge and ends will be brought to the surface. Using air tuggers and/or power from the support vessel, the messenger wire will be pulled toward amidships of the sunken barge. Messenger wire should slide over the submerged hull. Divers will ensure positioning is suitable for lifting (wires will be pulled from each end approximately 36 feet toward amidship). Once installed, small diameter messenger wire will be used to pull through 1" wire rope messenger.

Derrick Barge LOS ANGELES will be mobilized to the wreck site to continue rigging preparations (specifications included as attachment B). DB LOS ANGELES will initially spud down forward (north west) of the casualty barge. Spudding of the barge will follow the Best Management for spud barges in order

¹ Global Diving recommends against using a silt curtain around the site. As a silt curtain vendor and installer, we have no issue with the deployment and use of the curtain and on many projects it can be a good tool to confine turbidity while moving dredging spoils repeatedly through the water column. However, we believe that the use of a silt curtain in this project will actually cause an increase to the water turbidity around the site. This increase in turbidity would be due to the contact of 300+ feet of silt curtain and required anchors on the bottom along with the associated tidal (12.5 ft) and wave movement of the floating curtain. We have recent experience as a contractor inspecting the bottom interface of silt curtains and we found that, while maintaining bottom contact is achievable, the weights at the bottom cause significant sediment disruption and the exterior of the curtain itself traps and then discharges silt in tide and waves. Typically, we recommend the use of a silt curtain only when sediments are being transported through the water column which will not be the case in this project. Mulvihill et al. (1980) states that "the greatest increases in turbidity are dredging and filling, and pile driving or jetting" which will not be performed on this project.



to mitigate risks from disturbing contaminated sediments: the spuds will be marked with depth measurements for monitoring, an effort will be made to only spud barges down once, spuds will be raised at the slowest possible speed, and support tugs on site will move at the slowest speed at which they can maintain effective barge control. Any observed sediment plumes will be reported in daily operations reports.

3-1/2" Chain rigging will be hung from the hook of DB LOS ANGELES and connected to the wire rope messengers basketed below the wreck. With chain hung from the whip line and the wire rope messenger attached to the main block, DB LOS ANGELES will pull the wire rope messenger attached to the chain until the chains are centered below the hull.

One chain sling each in a basket configuration will be used at the fore and aft rigging locations. These slings will consist of 90' long 3.5" Diameter ABS Grade 3 Stud-Link Chain (Safe Working Load of 160 short tons in a vertical pull each with a safety factor of 4). In a basket configuration, these two chain slings will provide a safe working load sling capacity of 320 short tons.

Chain slings will be secured to the wreck by diver. Slings will be held in position using 50' lengths of 1' wide 4-ply nylon straps that will be attached to the chain by multiple wraps of nylon endlesses.

2.2 Lifting and Refloating

2.2.1 Lift Connections

DB 24 will be mobilized to the wreck site (specifications included as Attachment C). Once on site, DB 24 and DB LOS ANGELES will spud down perpendicular to the casualty barge as shown in Figure 4. Cranes in the lifting arrangement will block the Hylebos Waterway. Notifications to the Port of Tacoma, Vessel Traffic Service, and Tacoma Pilots will be made to ensure operations do not impact waterways traffic.

DB 24 and DB LOS ANGELES will be attached to the chains below the casualty barge by divers using four each 80' long 9-part braided wire rope slings rated at 162 short tons SWL each. Each length of chain will be shackled to the braided wire rope using Marquip 222 short ton capacity chain shackles. The estimated radius of the cranes is 25 feet off the stern. DB LOS ANGELES, the smaller of the two cranes, will have a capacity of 200 short tons and will be lifting an estimated 117 short tons (60% capacity). Because the actual weight and watertight integrity of the barge is unknown, the lifting equipment for the wreck was designed with significant overcapacity.



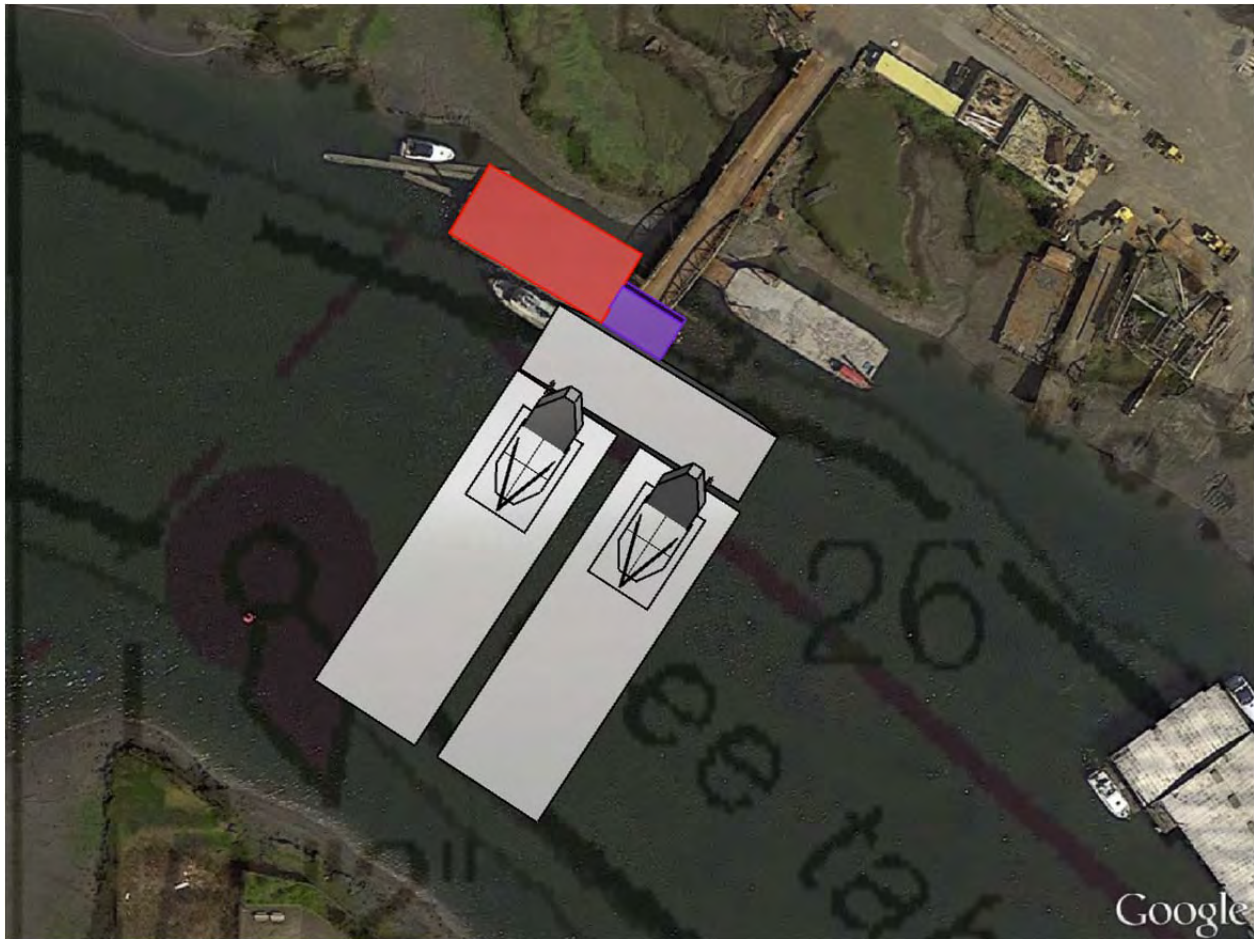


Figure 4: Crane Lift Locations

2.2.2 Lifting Operations

Global's Salvage Master will direct lifting of the barge coordinating the two-crane-lift so that the load remains appropriately balanced between the two cranes. Lifting will raise the barge so that her decks are awash and pumping and dive survey can commence.

2.2.3 Dewatering

Divers will conduct a damage survey of the newly exposed hull. Salvage crews will begin dewatering by pumping flooded compartments into the containment boom. Divers will patch hull damage as necessary to ensure the effectiveness of pumping. If access to internal compartments is needed during dewatering, a marine chemist will be used to certify the air quality of the compartments prior to personnel entry. Personnel will not enter permit required confined spaces (those spaces that require the marine chemist to issue a certificate). Dewatering and patching will continue until the vessel is free floating. Crane loads will be monitored throughout dewatering. When dewatering is complete, the Derrick Barges will be released.



2.3 Towing

Global will work with Sealevel Bulkhead Builders to identify an appropriate final destination for the barge. If necessary, Global will develop a deadship tow plan to be submitted to the USCG.

3 Salvage Operations Schedule

Operations may begin as soon as regulatory approval is granted.

4 Weather Criteria

Global's Salvage Master will determine limiting weather conditions for operations at the wreck site. Although the location of the wreck is well protected, high winds could limit crane operations. Tide information for November is provided below.

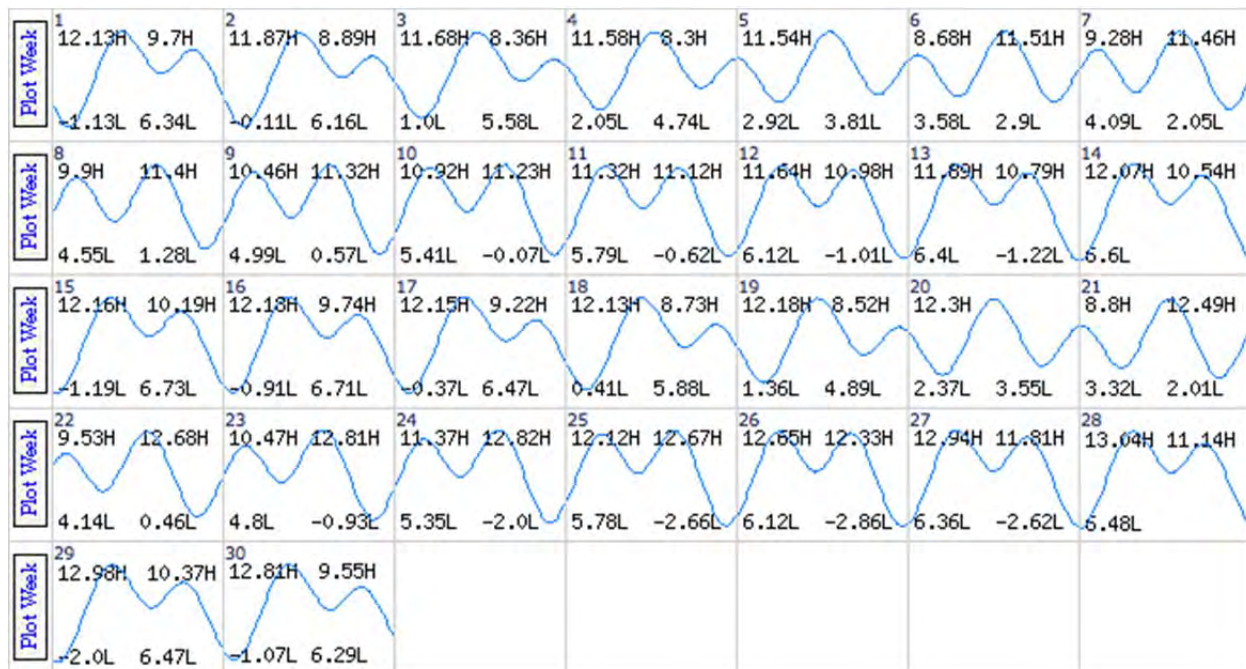


Figure 5: November Tides for Tacoma (Station 9446484)



5 Safety

Global's Site Safety Plan will be developed and will be available on the PRUDHOE BAY throughout operations. Global's safety personnel will review personal protective measures for operating around the contaminated soils and appropriate precautions will be taken. If necessary, fully encapsulated hazardous material dry suits and positive pressure, sealing dive helmets will be used with an appropriate decontamination station on deck of PRUDHOE BAY.

5.1 Regulatory Compliance

As a rule, Global Diving & Salvage, Inc. performs all underwater related work to the standards set forth by the governing body of the Association of Diving Contractors International (ADCI). If there is any conflict between operational standards set forth by the ADCI and another organization such as OSHA, Global Diving & Salvage will adhere to whichever rule is the most conservative when applied to the safety of any person working at the site.

All site activities will also comply with the following regulations and guidance publications:

- Occupational Safety and Health Administration Construction Industry Standards, 29 CFR 1926
- Occupational Safety and Health Administration General Industry Standards, 29 CFR 1910.410-440
- Occupational Safety and Health Administration "Hazardous Waste Operations and Emergency Response", 29 CFR 1926.65
- Other applicable federal, state, and local safety and health requirements, including the Global Diving & Salvage, Inc, *Manual of Safe Diving Practices*.



Attachment A: DSV PRUDHOE BAY Specifications



Specifications

Vessel Name	Prudhoe Bay	USCG Doc Nbr	520254
Vessel Service	Industrial Vessel	Call Sign	WCO 2744
Trade Indicator	Coastwise Unrestricted	Length	62.0 ft
Hull Material	Steel	Hull Depth	4.7 ft
Year Built	1969	Hull Breadth	22.0 ft
Ship Builder	Colber, Inc.	Gross Tonnage	50
Hailing Port	Seattle, WA	Net Tonnage	34
Owner	Global Diving & Salvage, Inc.	Cargo Capacity	Approx 20LT

Navigation & Communication

VHF Radios	2 ea SEA 156
Satellite Radio	1 ea Primera Sat Radio
Loudhailer	Ray 400 Loudhailer w/ 3 horns
Sounder	Furuno FCV 620 Sounder
Chart Plotter	Sitex Color Max 11
Radar	Furuno Model 1932 Mark 2
Auto Pilot	Com-Nav Autopilot

Tank Capacities

Fuel Tank	4,500 gal
Fresh Water	300 gal
Lube Oil	100 gal
Slop Tank	5,000 gal

* Trimble Differential GPS & KVH Fluxgate Compass (available by request)

Auxiliary Machinery & Equipment

- | | |
|--|--|
| (1) 14' x 14' Bow ramp | (4) 500 pound danforth anchors and fairleads |
| (2) 25 ton hydraulic, pilot house controlled, Beebe makeup/ bow ramp winches | (1) 185 CFM rotary air compressor with air supply below deck |
| (1) hydraulic crane: 12,000 lb. Capacity, 36' two piece extendable boom, dual controls | (1) 400 amp diesel powered welding machine |
| (2) hydraulic capstans mounted port and starboard forward | (1) 12" x 40' spud with removable spud well located port bow |
| (4) pneumatic anchor winches, 2,500 pound capacity | |

MORE THAN JUST A DIVING COMPANY

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Attachment B: Derrick Barge LOS ANGELES Specifications



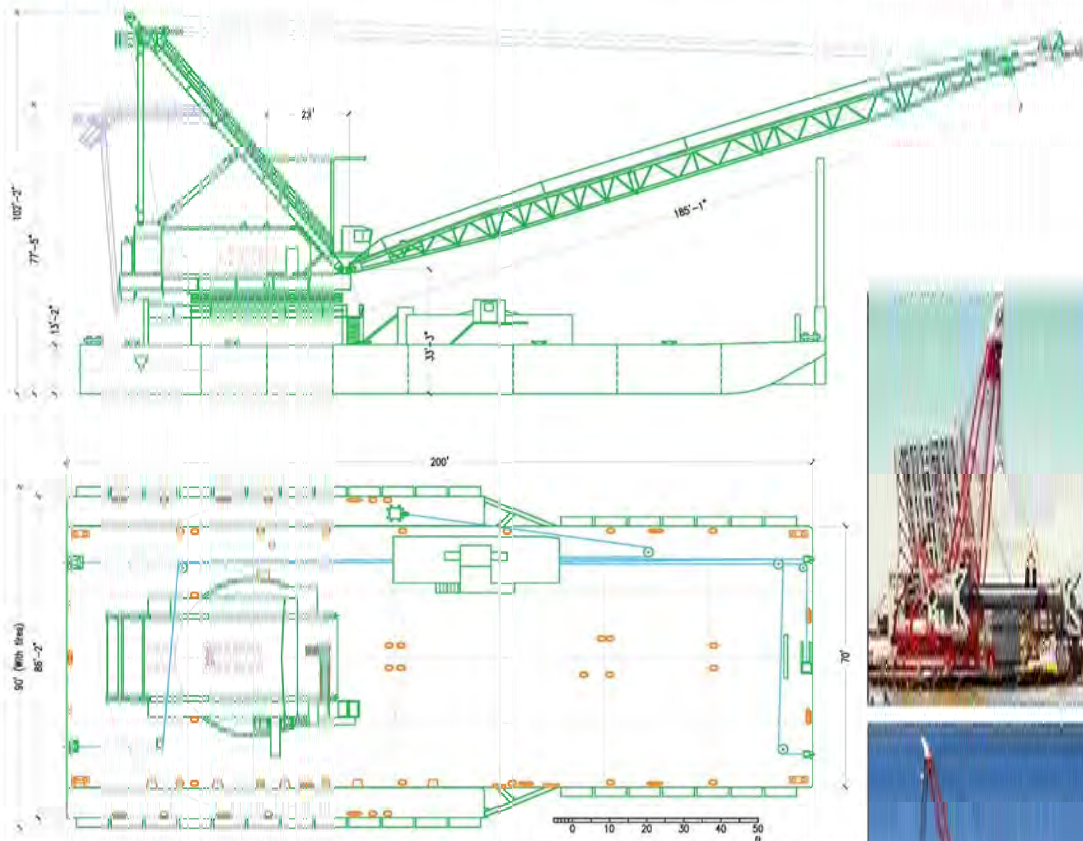
**GENERAL
CONSTRUCTION
COMPANY**

D.B. Los Angeles
300 TON FLOATING CRANE

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Manson Derrick 24

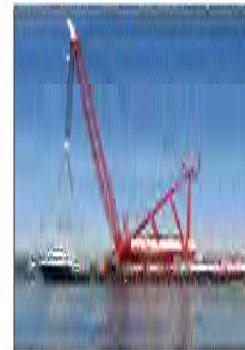


Miscellaneous Characteristics

Crane Manufacture	Clyde Iron Works
Model Number	42-DI-145
Serial Number	CW 3931
Circle Diameter	42" Diameter
Rigging Wire	
Main Hoist	5,150' 1 1/4" 6x26
2-Part Whip	1,150' 1 1/4" 6x26
Whip Line	550' 1" 6x26
Boom (Topping Gear)	5,250' 1 1/4" 6x26

Miscellaneous Characteristics

Spud Wire	
Side Spud	360' 1 1/4"
Stern Spud	360' 1 1/4"
Anchor Wire	
Stern Anchors (2)	1,700' 1 1/4" 6x26
Bow Anchors (2)	1,700' 1 1/4" 6x26
Normal Fuel Capacity	40,000 Gallons (1"=307 Gallons)
Boom (Topping Gear)	3,000 Gallons



Principal Characteristics

Length Overall	200'-0"
Beam Overall (With Pontoons & Tires)	90'-0"
Beam Overall (With Pontoons)	86'-2"
Beam Overall (W/O Pontoon)	78'-0"
Barge Depth	13'-0"
Minimum Draft	7'-0"
Distance Deck to Boom Heel	22'-3"
Boom Length to Main Block	185'-0"
Boom Length to 2-Part Whip	156'-0"
Boom Length to Whip	207'-2"
Boom Length Main to Whip	22'-0"
Spuds - 92' Each, Good to 70' Depth	2 - Each

